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HEWLETT-PACKARD COMPANY  
Intellectual Property Administration  
P.O. Box 272400  
Fort Collins, CO 80527-2400

EXAMINER
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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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*Ex parte* LOWELL E. KOLB,  
KRISTINA L. MANN,  
SAMUEL M. BABB,  
PAUL H. MAZURKIEWICZ and  
KERI K. SIBLEY

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Appeal 2008-2447  
Application 09/813,257  
Technology Center 2800

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Decided: August 8, 2008

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Before CHARLES F. WARREN, TERRY J. OWENS, and  
THOMAS A. WALTZ, *Administrative Patent Judges*.

OWENS, *Administrative Patent Judge*.

DECISION ON APPEAL

The Appellants appeal from a rejection of claims 1 and 3-17, which are all of the pending claims.

THE INVENTION

The Appellants claim a printed circuit board. Claim 1 is illustrative:

1. A printed circuit board comprising:

a printed wiring board;

a component mounted on the printed wiring board, wherein the printed circuit board has a volume of space bounded by at least one of a body of the component, a lead of the component, and said printed wiring board, wherein said volume of space has at least one opening on the surface of the printed circuit board; and

an electrically non-conductive filler material disposed on the surface of the printed circuit board so as to bridge across the at least one opening of the volume of space to render the volume of space substantially inaccessible to subsequently-applied coatings.

#### THE REFERENCES

Higgins	US 5,639,989	Jun. 17, 1997
Kotani (as translated)	JP P2000-34457A	Feb. 2, 2000
McCullough	US 6,127,038	Oct. 3, 2000

#### THE REJECTIONS

The claims stand rejected as follows: claims 1, 3-5, 7, 11, 12, 14 and 15 under 35 U.S.C. § 102(e) over McCullough; claims 6, 8-10, 13 and 17 under 35 U.S.C. § 103 over McCullough in view of Kotani; and claim 16 under 35 U.S.C. § 103 over McCullough in view of Higgins.

#### OPINION

We affirm the Examiner's rejections.

Rejection of claims 1, 3-5, 7, 11, 12, 14 and 15  
under 35 U.S.C. § 102(e) over McCullough

The Appellants argue only the independent claims, i.e., claims 1 and 12 (Br. 5-11). We therefore limit our discussion to those claims. *See* 37 C.F.R. § 41.37(c)(1)(vii) (2007).

McCullough discloses a printed circuit board having a two-layer conformal coating for corrosion resistance (col. 1, ll. 7-10). The first coating layer (14) preferably comprises parylene but also can comprise urethane, acrylic, epoxy and silicone-based resins (col. 3, ll. 52-58). Regarding the coverage of that layer, McCullough discloses:

It is important that the first coating layer is deposited to cover most, if not all, of the exposed surfaces on the board, components and leads. Care should be taken to coat between and behind lead surfaces [col. 2, ll. 27-30].

\* \* \*

A first coating layer **14** is deposited on most, and preferably all, of the printed circuit board surfaces **20**, component surface **22** and lead surfaces **24** that may be potentially exposed to air, moisture or water. Although depositing the first coating layer **14** on all surfaces may be impractical or impossible, efforts should be made to maximize coverage [col. 3, ll. 8-14].

The second coating layer is a corrosion inhibiting viscous fluid that is applied onto the first coating layer, thereby filling in gaps and flexible openings occurring in the first coating layer so as to provide a sealed, stratified coating (col. 2, ll. 35-41). McCullough teaches that the second coating layer “fills in the gaps, movable areas and flexible openings

occurring in the first coating layer due to variations or openings in the first layer or openings caused by board topography or component configuration, such as openings or areas associated with movable parts and switches” (col. 3, l. 67 – col. 4, l. 4), and “forms a viscous layer which seals the first coating **14** and any areas of possible penetration left thereby” (col. 4, ll. 7-8). “Like the first coating, the second coating should cover most, if not all, of the printed circuit board, components and lead surfaces” (col. 2, ll. 41-43). The corrosion inhibiting viscous fluid is exemplified only as “Elektro-tech B Super-core” (col. 4, ll. 22-25).

The Appellants acknowledge that in McCullough “[t]here is a cavity or volume of space bounded by surfaces of the component, the component leads and the printed wiring board” (Br. 6). The Appellants argue that McCullough does not teach or suggest that the first coating layer (which corresponds to the Appellants’ electrically non-conductive filler material) bridges across a cavity opening so as to render the cavity substantially inaccessible to the second coating layer (claim 1) or to encapsulate and seal the cavity (claim 12) (Br. 8-10).

The Appellants do not define “substantially” in their Specification. Hence, we use the ordinary meaning of “substantial” which is “being largely but not wholly that which is specified”.<sup>1</sup> Because the coverage of McCullough’s first coating layer is maximized such that it covers most, and preferably all, of the exposed surfaces of the board, components and leads, including between and behind lead surfaces (col. 2, ll. 27-30; col. 3, ll. 8-14), the coating layer largely, if not wholly, covers those surfaces and,

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<sup>1</sup> *Webster’s New Collegiate Dictionary* (G. & C. Merriam 1973).

therefore, at least renders the cavities substantially inaccessible to the second coating layer as required by the Appellants' claim 1, and can encapsulate and seal the cavities as required by the Appellants' claim 12.

The Appellants argue that McCullough's first coating layer cannot bridge across cavity openings because if it did so, the stated purpose of the second coating layer, i.e., providing a continuous, conformal stratified coating, could not be achieved (Br. 10-11).

McCullough's second coating layer "seals the first coating **14** and any areas of possible penetration left thereby" (col. 4, ll. 7-8). Thus, the second coating layer performs the function of sealing the first coating layer even when there are no areas of penetration left by the first coating layer.

For the above reasons we are not persuaded of reversible error in the rejection of claims 1, 3-5, 7, 11, 12, 14 and 15.

Rejection of claims 6, 8-10, 13 and 17 under  
35 U.S.C. § 103 over McCullough in view of Kotani

The Appellants argue that a thixotropic epoxy would be unsuitable for McCullough's preferred method for applying the first coating, which is vacuum deposition (col. 3, ll. 61-62) (Br. 12).

That argument is not well taken because it is merely unsupported attorney argument, and arguments of counsel cannot take the place of evidence. *See In re De Blauwe*, 736 F.2d 699, 705 (Fed. Cir. 1984). One of ordinary skill in the art would have been led by McCullough's disclosure of an epoxy first coating layer material (col. 3, ll. 52-54) to use either a thixotropic or dilatant epoxy, particularly the more common thixotropic

epoxy.<sup>2</sup> Vacuum deposition is merely McCullough's preferred coating technique (col. 3, ll. 61-62). One of ordinary skill in the art would have been led, through no more than ordinary creativity, to select the most effective technique for achieving the desired goal of maximizing the coverage by the epoxy of the exposed surfaces of the board, components and leads, including between and behind lead surfaces (col. 2, ll. 27-30; col. 3, ll. 8-14). *See KSR Int'l. Co. v. Teleflex, Inc.*, 127 S. Ct. 1727, 1741 (2007) (In making the obviousness determination one "can take account of the inferences and creative steps that a person of ordinary skill in the art would employ").

We therefore are not convinced of reversible error in the rejection of claims 6, 8-10, 13 and 17.<sup>3</sup>

Rejection of claim 16 under 35 U.S.C. § 103  
over McCullough in view of Higgins

Higgins discloses a printed circuit board having applied thereto a highly insulative polymer coating and then multiple electrically conductive shielding layers that conduct induced currents to ground, either through direct connection or indirectly through underlying layers (col. 4, ll. 54-58; col. 5, ll. 18-24).

The Appellants argue that McCullough does not mention a need or desire to provide ground shielding potential to the printed circuit board, that there is no teaching or suggestion in the art to replace Higgins's insulating coating with McCullough's stratified coating, and that there is no other

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<sup>2</sup> See, e.g., <http://www.emersoncumming.com/other//viscosityandhardness.pdf> (1999) ("Epoxies are usually non-newtonian and are thixotropic in nature at least to some degree. Very few epoxies are dilatant").

<sup>3</sup> A discussion of Kotani is not necessary to our decision.

reason that can be derived from the prior art to combine the references (Br. 13).

The reason would have been to provide electromagnetic interference shielding capability to McCullough's printed circuit board according to the teachings of Higgins. As stated by the Supreme Court in *KSR*, "if a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill." *KSR*, 127 S. Ct. at 1740.

Accordingly, we are not persuaded of reversible error in the rejection of claim 16.

#### DECISION

The rejections of claims 1, 3-5, 7, 11, 12, 14 and 15 under 35 U.S.C. § 102(e) over McCullough, claims 6, 8-10, 13 and 17 under 35 U.S.C. § 103 over McCullough in view of Kotani, and claim 16 under 35 U.S.C. § 103 over McCullough in view of Higgins are affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a).

AFFIRMED

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HEWLETT-PACKARD COMPANY  
INTELLECTUAL PROPERTY ADMIN.  
P. O. BOX 272400  
FORT COLLINS, CO 80527-2400